

Recovery Plan Action Status

Plan Name: Lost River (*Deltistes luxatus*) and Shortnose (*Chasmistes brevirostris*) Sucker Recovery Plan

Plan Status: Final

Plan Date: 17-Mar-93

Lead Agency: USFWS

Lead Office: Klamath Falls Fish And Wildlife Office

(855-8481)

Species	Action Priority #	Action #	Action Description	Action Status	Est. Initiation Date	Est. Completion Date	Responsible Parties	Work Type	Labor Type	Action Comments
Lost River sucker (<i>Deltistes luxatus</i>), Shortnose Sucker (<i>Chasmistes brevirostris</i>)	1	111	Characterize the genetic component of the four Klamath Basin sucker species	Partially Complete	FY 1995 - FY 1999		Oregon Department of Fish and Wildlife, Klamath Tribe, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game	Research: Genetics	Contract	Genetics work has been on going since about 1999 or earlier. One or more manuscripts are being developed for publication in 2009. Participating experts are: Doug Markle (OSU); Tom Dowling (ASU); and Bernie May (UCD).
Lost River sucker (<i>Deltistes luxatus</i>), Shortnose Sucker (<i>Chasmistes brevirostris</i>)	1	112	Prepare a comprehensive genetic management plan for refugial populations	Not Started			Oregon Department of Fish and Wildlife, Klamath Tribe, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game	Management: Planning	Contract	A new recovery plan is underdevelopment to be finalized in 2010.
Lost River sucker (<i>Deltistes luxatus</i>), Shortnose Sucker (<i>Chasmistes brevirostris</i>)	1	11311	Assess potential refugia for Upper Klamath Lake suckers	Discontinued	FY 2000 - FY 2004		Oregon Department of Fish and Wildlife, Klamath Tribe, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game, U.S. Forest Service	Research: Habitat Requirements	Internal Technical Assistance	So far there has not been any practicable refugia located. Off-lake rearing is being considered and that action could provide a refugium.
Lost River sucker (<i>Deltistes luxatus</i>), Shortnose Sucker (<i>Chasmistes brevirostris</i>)	1	11312	Select sites for refugial populations of Upper Klamath Lake suckers	Discontinued	FY 2000 - FY 2004		Oregon Department of Fish and Wildlife, Klamath Tribe, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game, U.S. Forest Service	Research: Habitat Status	Internal Technical Assistance	

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Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	11313	Secure refugial sites for Upper Klamath Lake suckers	Ongoing Current	FY 2000 - FY 2004		Oregon Department of Fish and Wildlife, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service	Acquisition: Other	Internal Technical Assistance	
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	11314	Develop a plan to introduce Lost River and shortnose suckers from Upper Klamath Lake	Not Started			Oregon Department of Fish and Wildlife, Klamath Tribe, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service	Management: Planning	Internal Technical Assistance	A new recovery plan is underdevelopment.
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	11315	Implement the plan to introduce Lost River and shortnose suckers from Upper Klamath Lake	Not Started			Oregon Department of Fish and Wildlife, Klamath Tribe, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service	Management	Internal Administrative	
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	11321	Assess potential for refugia sites for Clear Lake suckers	Discontinued	FY 1995 - FY 1999		Oregon Department of Fish and Wildlife, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game, U.S. Forest Service	Management: Other	Internal Technical Assistance	
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	11322	Select sites for refugial populations of Clear Lake suckers	Not Started			Oregon Department of Fish and Wildlife, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game, U.S. Forest Service	Management	Internal Technical Assistance	
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	11323	Secure refugial sites for Clear Lake suckers	Not Started			Oregon Department of Fish and Wildlife, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game, U.S. Forest Service	Acquisition: General	Internal Administrative	

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Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	11324	Develop a plan to introduce Lost River and snortnose suckers from Clear Lake into refugial sites	Not Started			U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, U.S. Forest Service	Management: Planning	Internal Technical Assistance	
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	11325	Implement the plan to introduce Lost River and shortnose suckers from Clear Lake	Not Started			Oregon Department of Fish and Wildlife, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game, U.S. Forest Service	Management: Other	Internal Technical Assistance	
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	121	Assess the need for captive propagation	Ongoing Current	FY 2000 - FY 2004		Oregon Department of Fish and Wildlife, Klamath Tribe, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game	Management: Propagation	Internal Technical Assistance	
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	122	Investigate refining propagation techniques	Ongoing Current	FY 2006		Klamath Tribe, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service	Management: Propagation	Internal Technical Assistance	In 2006 and 2007, larval suckers were successfully collected and reared in a hatchery. Some of those fish were reared for two years. The hatchery operation was ended in 2009.
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	131	Develop monitoring plan for refugial sites	Discontinued			Oregon Department of Fish and Wildlife, Klamath Tribe, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game	Management: Planning	Species Expert	
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	132	Implement the monitoring plan for refugial sites	Not Started			Oregon Department of Fish and Wildlife, Klamath Tribe, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game	Management: Habitat Maintenance and Manipulation	Species Expert	

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Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	211	Develop effective sampling methods for all life stages of suckers	Ongoing Current	FY 2000 - FY 2004		Oregon Department of Fish and Wildlife, Klamath Tribe, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game	Research: Demographic Studies	Contract	USGS and OSU are annually evaluating their monitoring methods.
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	212	Investigate alternative methods for ageing suckers that would be non-lethal	Planned	FY 2008		U.S. Fish and Wildlife Service	Research: Demographic Studies	Contract	BRD has indicated that there is no alternative way to age suckers that does not use bones or otoliths.
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	213	Develop a plan to monitor relative abundance of all life stages for all sucker populations.	Ongoing Current	FY 2000 - FY 2004		Oregon Department of Fish and Wildlife, Klamath Tribe, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game	Management: Planning	Contract	Plans have been developed for monitoring all life stages.
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	214	Implement plan to monitor relative abundance of all sucker populations	Ongoing Current	Prior to FY 1995		Oregon Department of Fish and Wildlife, Klamath Tribe, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game	Research: Demographic Studies	Contract	OSU and USGS have been monitoring sucker populations since about 1992 and it continues today.

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Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	221	Investigate recruitment bottlenecks in Upper Klamath Basin	Ongoing Current	FY 2000 - FY 2004		Oregon Department of Fish and Wildlife, Klamath Tribe, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, U.S. Forest Service	Research: Demographic Studies	Contract	Studies on recruitment have been ongoing for about a decade. Doug Markle, OSU has done most of the work but USGS-BRD is also doing studies on recruitment. No one factor seems to be the cause of inadequate recruitment. Both entrainment at Link River Dam and fish health/water quality seem to be the major factors, although predation may also be important. New information indicates that fish health may be an important factor affecting recruitment. Survivorship of the large 2006 year class was low based on sampling in 2007-2009. YOY suckers collected by BOR in Link River in the summer of 06 were in poor condition and when some were held for 24 h they died. Fish health studies have been conducted from 2007-2009.

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Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	222	Investigate lack of recruitment at Copco Reservoir	Complete	FY 1995 - FY 1999	FY 2000 - FY 2004	PacificCorp, Pacific Power & Light Company, U.S. Fish and Wildlife Service, California Department of Fish and Game	Research: Demographic Studies	Species Expert	In 1998 and 1999 Desjardins and Markle studied sucker populations in the three downstream reservoirs on the Klamath River. They concluded in a 2000 report (Distribution and biology of suckers in lower Klamath reservoirs that recruitment was lacking owing to spawning and rearing habitats. They concluded that suckers in the three reservoirs were most likely waifs that drifted downstream from UKL.
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	223	Determine which reservoirs in the Klamath and Lost River systems support viable, self-supporting populations of suckers.	Complete	FY 2000 - FY 2004	FY 2000 - FY 2004	Oregon Department of Fish and Wildlife, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game	Research: Habitat Requirements	Species Expert	See comment at 222 above
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	224	Determine effects of introduced species on sucker populations	Ongoing Current	FY 1995 - FY 1999		Oregon Department of Fish and Wildlife, Klamath Tribe, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game	Research: Predation	Species Expert	Some work has been done on this topic and it has been summarized in a new paper by Markle and Dunsmoor 2007. They have evidence that fathead minnows are affecting survival of age 0 suckers in UKL. Additional studies are warranted on this topic.

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Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	2251	Assess losses of fish due to water diversions	Ongoing Current	FY 1995 - FY 1999		Klamath Basin irrigation districts, PacifiCorp, Pacific Power & Light Company, U.S. Bureau of Reclamation	Research: Other Information	Contract	Some studies have been done on entrainment of suckers. Gutermuth et al. (2000) evaluated entrainment at the A-canal and at the Link River hydropower diversions and found that it was substantial, especially for age 0 suckers. A-canal was screened in 2003. Reclamation is assessing the effectiveness of the screen. Additional studies are underway or planned. Reclamation did some screw trapping below Link River Dam in 2006 and collected 6,000 YOA suckers. Reclamation or its contractor conducted additional sampling in 2008 and 2009, but far fewer suckers were collected than in 2006.
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	2252	Develop plan to reduce losses of fish due to water diversions	Ongoing Current	FY 2000 - FY 2004		Klamath Basin irrigation districts, PacifiCorp, Pacific Power & Light Company, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service	Management: Planning	Contract	Reclamation determined that there is less entrainment at Link River Dam by going to surface spill versus the normal bottom release gates. However, there was a high percentage of impaired fish suggesting that entrained suckers may be in poor condition and may not survive.

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Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	2253	Implement plan to reduce losses of fish associated with water diversions	Ongoing Current	FY 2000 - FY 2004		Klamath Basin irrigation districts, PacifiCorp, Pacific Power & Light Company, U.S. Bureau of Reclamation	Other	Contract	Reclamation has developed a draft plan to reduce entrainment at Project diversions and an interagency working group is helping refine the plan. The A-Canal was screened in 2003. Reclamation and the State of Oregon are funding one or more screening projects in FY08.
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	226	Compare survival of larval and juvenile suckers in different habitat types in the Upper Klamath Basin	Ongoing Current	FY 2000 - FY 2004		Oregon Department of Fish and Wildlife, Klamath Tribe, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game	Research: Habitat Requirements	Species Expert	Doug Markle (OSU) and USGS-BRD have been working on age 0 sucker survival and production in UKL for some time. Some results are coming from those studies but year-to-year variability in lake and weather make it difficult to conclude what is affecting survival. No juvenile sucker studies have occurred at Clear Lake.

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Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	2311	Determine distribution and abundance of suckers in Upper Klamath lake	Ongoing Current	Prior to FY 1995		Oregon Department of Fish and Wildlife, Klamath Tribe, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service	Research: Population Surveys	Contract	OSU and USGS are monitoring sucker populations in UKL and in the Williamson River on an annual basis. OSU studies focus on larvae and juveniles and USGS is on adults but some juvenile work has been done too. Adult sucker population sizes and trends is primarily been studied through tag and recapture studies at the shoreline spawning sites and in the Williamson River. In 2005 a weir was installed on the Williamson R. It provided a substantial increase in numbers of suckers tagged. Use of the weir is likely to produce more demographic data and improve confidence limits on vital rates. In 2006 USGS installed PIT tag antennas and data loggers in the Sprague and Williamson Rivers and at shoreline springs. With these remote detectors, USGS gets much high recapture data for improved vital parameter estimates.

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Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	2312	Determine distribution and abundance of suckers in the river and reservoirs downstream of Upper Klamath Lake	Ongoing Current	Prior to FY 1995		Oregon Department of Fish and Wildlife, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game	Research: Population Surveys	Contract	Distribution and abundance of suckers in the Keno Reservoir/Lake Ewauna has been studied by OSU and Reclamation over the past several years (2004-2009). Numbers are low and sucker distribution is dependent on water quality. Studies in the lower Klamath River reservoirs was done in 1998-99 by Desjardins and Markle (2000). Most suckers are in Topsy and SNS dominate.
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	2313	Determine distribution and abundance of suckers in Clear Lake and upstream reservoirs after drought conditions.	Ongoing Current	Prior to FY 1995		U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game, U.S. Forest Service	Research: Population Surveys	Contract	USGS has monitored adult sucker populations in Clear Lake annually since 2004. Drought conditions have prevailed since 2000 and the east lobe is projected to nearly dry up in 2009. A diverse size structure is present but older fish might be lacking. Shortnose sucker recruitment has been low in recent years.

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Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	2314	Determine distribution and abundance of suckers in Gerber Reservoir and small reservoirs in the Lost River system	Ongoing Current	Prior to FY 1995		Oregon Department of Fish and Wildlife, U.S. Bureau of Land Management, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game	Research: Population Surveys	Contract	USGS sampled adult sucker populations in Gerber Reservoir from 2004-2006. A diverse size range was present suggesting regular recruitment. However, the taxonomic status of this population remains unresolved. They appear to be a highly hybridized group (shortnose sucker and Klamath largescale sucker).
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	2315	Determine distribution and abundance of populations of both sucker species in Tule Lake	Ongoing Current	FY 1995 - FY 1999		U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game	Research: Population Surveys	Internal Field Assistance	The Service conducted intensive population monitoring from 2006-2008 in Tule Lake. Adult populations of LRS and SNS appear to be about 1000 individuals. Few juveniles were sampled suggesting that recruitment is low. It appears that most suckers in Tule Lake come from Upper Klamath Lake or the Lost River.

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Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	2316	Determine distribution and abundance of populations of both suckers species in other waterbodies in the upper Klamath basin.	Ongoing Current	FY 2005		Oregon Department of Fish and Wildlife, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game	Research: Population Surveys	Internal Field Assistance	From 2005-2008, the Service has sampled suckers in the Williamson River system with emphasis in the Sprague River. A small resident population of LRS was documented on the Sprague River. Some juvenile SNS and LRS rearing occurs in the Sprague River particularly during higher flow years. USGS radio-tagged adult suckers at the Chiloquin Dam and Williamson River Weir and has tracked their upstream movements during spawning. Suckers are found upstream at least to Beatty.
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	232	Determine physiological tolerances of both sucker species to a combination of existing or potential water quality stresses	Partially Complete	FY 1995 - FY 1999		U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service	Research: Other Information	Contract	Considerable work has been done on the physiological tolerance of suckers to water quality. Studies have been done by Cech, Saikii, Meyer, and others both in the lab and in the field. Results show high tolerance to all parameters and little evidence of chronic effects.

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Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	2331	Determine habitat requirements of suckers in Upper Klamath Lake	Partially Complete	Prior to FY 1995		Oregon Department of Fish and Wildlife, Klamath Tribe, U.S. Bureau of Land Management, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, U.S. Forest Service	Research: Habitat Requirements	Contract	Based on over 10 years of monitoring and radio-tracking considerable information has been gathered on habitat requirements of suckers of all life stages in UKL. It is known that larvae seek vegetative cover, juveniles occur in most shoreline and offshore habitats, and adults move around the lake but in summer are concentrated at the north end of UKL and when water quality is poor they move in to Pelican Bay. Adults prefer depths of 6-9 feet.
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	2332	Determine the habitat requirements of suckers in the Lost River system	Ongoing Current	FY 1995 - FY 1999		Oregon Department of Fish and Wildlife, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game	Research: Habitat Requirements	Contract	Larval and juvenile habitat has not been evaluated in Clear Lake.
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	311	Develop a plan to monitor habitat and water quality conditions for all populations.	Ongoing Current	FY 2000 - FY 2004		Oregon Department of Fish and Wildlife, Klamath Tribe, U.S. Bureau of Land Management, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game, U.S. Forest Service	Research: Habitat Status	Contract	Water quality is being monitored in UKL, Clear lake, and Keno Reservoir during summer months using datasondes. Reclamation is doing moniting in Clear Lake, and Keno Reservoir. USGS and the Klamath Tribes monitor UKL. The Klamath Tribes monitor the Sprague and Williamson R. Plans exist for these efforts and they are revised annually.

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Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	312	Implement the plan to monitor habitat, water quality conditions for all sucker populations.	Ongoing Current	FY 2000 - FY 2004		Oregon Department of Fish and Wildlife, Klamath Tribe, U.S. Bureau of Land Management, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game, U.S. Forest Service	Research: Habitat Status	Contract	See comment at 311
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	321	Conduct external nutrient loading study	Ongoing Current	FY 1995 - FY 1999		Klamath Tribe, U.S. Bureau of Reclamation, U.S. Geological Survey	Research: Habitat Status	Contract	There have been a number of studies done on external nutrient loading in the UKL watershed. One of the more detailed studies was by Snyder and Morace (1997) USGS Water-Resources Investigations Report 97-4059. That study focused on nutrient levels being pumped from diked and drained wetlands around UKL. Another report is one by Kann and Walker (1999) Nutrient and hydrologic loading to Upper Klamath Lake, Oregon 1991-1998. The Klamath Tribes are currently monitoring nutrient loading in the Williamson and Sprague rivers (2004-2009).

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Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	322	Conduct an internal nutrient loading study	Ongoing Current	FY 2000 - FY 2004		Klamath Tribe, U.S. Bureau of Reclamation, U.S. Geological Survey	Research: Habitat Status	Contract	A number of studies have been done on nutrient loading in UKL. The TMDL for UKL and Agency Lake (DEQ 2002) reviewed that literature. The 2004 NRC report on Engangered and threatened fishes in the Klamath River basin also provided a review on the topic. There still appears to be some debate over the exact cause but it is clear that the amount is substantial.
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	323	Develop a nutrient budget for Upper Klamath and Agency Lakes	Partially Complete	FY 2000 - FY 2004		Klamath Tribe, U.S. Bureau of Reclamation, U.S. Geological Survey	Research: Habitat Status	Contract	The 2002 TMDL for UKL developed ODEQ was based on a nutrient budget developed by Kann and Walker (2001).
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	324	Establish water quality goals	Partially Complete	FY 2000 - FY 2004		North Coast Regional Water Quality Control Board, Oregon Department of Fish and Wildlife, Oregon Department of Environmental Quality, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, U.S. Geological Survey, California Department of Fish and Game	Research: Habitat Status	Contract	The 2002 TMDL and water quality management plan established goals for the UKL subbasin. A final TMDL was released in 2009 for the Oregon portion of the Klamath River.

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Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	3251	Identify riparian land parcels for rehabilitation	Ongoing Current	FY 1995 - FY 1999		Oregon Department of Fish and Wildlife, Klamath Tribe, U.S. Bureau of Land Management, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game, U.S. Forest Service, Natural Resources Conservation Service	Management: Planning	Internal Administrative	Efforts are underway to develop information that can be used to prioritize restoration. The Klamath Tribes, USGS, FWS, Klamath Watershed Partnership and NRCS are gathering data in the Williamson and Sprague River watershed that will help in this process.
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	3252	Prioritize sites for riparian rehabilitation	Ongoing Current	FY 1995 - FY 1999		U.S. Fish and Wildlife Service, Natural Resources Conservation Service	Management: Planning	Internal Administrative	Efforts are underway to prioritize restoration. The Klamath Tribes, Klamath Watershed Partnership, and others are working with us to provide input into priority actions for recovery. Internally the Service has assessed recovery needs and has developed a list of priority actions. As additional information comes in those plans will be revised and updated accordingly.
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	3253	Select Riparian Management areas	Ongoing Current	FY 1995 - FY 1999		U.S. Fish and Wildlife Service, Natural Resources Conservation Service	Management: Planning	Internal Administrative	See 3251 above
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	32541	Identify riparian landowners	Ongoing Current	FY 1995 - FY 1999		U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, Natural Resources Conservation Service	Management: Planning	Internal Administrative	See 3251 above

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Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	32542	Secure riparian habitat for rehabilitation	Ongoing Current	FY 2000 - FY 2004		Oregon Department of Fish and Wildlife, Klamath Basin irrigation districts, U.S. Bureau of Land Management, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game, U.S. Forest Service, Natural Resources Conservation Service	Acquisition: Fee Title	Internal Administrative	Three former diked and drained wetlands have been acquired by the Interior Department and their management changed so they likely contribute less nutrient loading to Upper Klamath Lake. In 1994, the Bureau of Land Management acquired 3,000 acres at the mouth of the Wood River. The Bureau of Reclamation, FWS, and The Nature Conservancy have acquired 10,000 acres on the west side of Agency Lake. Currently, Reclamation is operating the land for water storage and seasonal wetlands. The Nature Conservancy (TNC) purchased 6,400 acres at the mouth of the Williamson River. TNC reconnected the diked and drained wetlands to the lake in 2007 and 2008.

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Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	32543	Develop riparian management unit rehabilitation plans	Ongoing Current	FY 2000 - FY 2004		Oregon Department of Fish and Wildlife, Klamath Basin irrigation districts, Klamath Tribe, U.S. Bureau of Land Management, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game, U.S. Forest Service, Natural Resources Conservation Service	Management: Planning	Internal Administrative	The BLM developed and implemented a plan for the Wood River Wetlands project (3,000 acres). TNC developed a plan for the Lower Williamson River Preserve (6,400 acres) in 2005. Agency Lake and Barnes Ranches (10,000 acres) lacks a management plan because future management options are still being considered. See also 32542.
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	32544	Implement riparian rehabilitation plans	Ongoing Current	FY 2000 - FY 2004		Oregon Department of Fish and Wildlife, Klamath Basin irrigation districts, Klamath Tribe, U.S. Bureau of Land Management, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game, U.S. Forest Service, Natural Resources Conservation Service	Management: Planning	Internal Administrative	See 32541 to 32543 above.
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	3261	Identify land parcels for wetland rehabilitation	Ongoing Current	FY 2000 - FY 2004		Oregon Department of Fish and Wildlife, Klamath Tribe, U.S. Bureau of Land Management, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game, U.S. Forest Service, Natural Resources Conservation Service	Management: Planning	Internal Administrative	See discussion above for 3251.

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Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	32621	Select sites for pilot wetland rehabilitation	Partially Complete	FY 2000 - FY 2004		Oregon Department of Fish and Wildlife, Klamath Tribe, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game	Management: Planning	Internal Administrative	A number of restoration projects have been completed that could serve as pilot projects. The Running Y Ranch has restored 100 acres of wetlands as mitigation for wildlife habitat lost to development. BLM has restored river form and function on lower 3 miles of the Wood River. TNC has restored about 3,000 acres of floodplain habitat on the lower Williamson River. Additional restoration projects have occurred throughout the watershed. Because of the number and diversity of projects that have been completed it could be concluded that the pilot level work is now done.
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	32622	Identify landowners of pilot wetland rehabilitation sites	Partially Complete	FY 2000 - FY 2004		U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service	Management: Planning	Internal Administrative	See 32621 above.
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	32623	Secure areas for pilot wetland rehabilitation project	Ongoing Current	FY 2006		Oregon Department of Fish and Wildlife, U.S. Bureau of Land Management, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game, U.S. Forest Service, Natural Resources Conservation Service	Acquisition	Internal Administrative	A pilot treatment wetland was constructed at the Yanix Ranch in 2006 (lower Sycan River).

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Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	32624	Develop plans for pilot wetland project	Partially Complete	FY 2000 - FY 2004		Oregon Department of Fish and Wildlife, Klamath Tribe, Oregon Department of Environmental Quality, U.S. Bureau of Land Management, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game, U.S. Forest Service, Natural Resources Conservation Service	Management: Planning	Internal Administrative	See 32621 above.
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	32625	Implement the plan for wetland rehabilitation pilot projects	Ongoing Current	FY 2000 - FY 2004		Oregon Department of Fish and Wildlife, Oregon Department of Environmental Quality, U.S. Bureau of Land Management, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game, U.S. Forest Service, Natural Resources Conservation Service	Management: Planning	Internal Administrative	See 32621 above.

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Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	3263	Develop a long-term plan for wetland rehabilitation	Partially Complete	FY 2000 - FY 2004		California Department of Water Resources, County governments, North Coast Regional Water Quality Control Board, Oregon Department of Fish and Wildlife, Oregon Department of Water Resources, Klamath Basin irrigation districts, Klamath Tribe, PacifiCorp, Pacific Power & Light Company, Oregon Department of Environmental Quality, U.S. Bureau of Land Management, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game, U.S. Forest Service, Natural Resources Conservation Service	Management: Planning	Contract	

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Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	3264	Implement the long-term plan for wetland rehabilitation	Not Started			County governments, Oregon Department of Fish and Wildlife, Klamath Basin irrigation districts, Klamath Tribe, PacifiCorp, Pacific Power & Light Company, Oregon Department of Environmental Quality, U.S. Bureau of Land Management, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game, U.S. Forest Service, Natural Resources Conservation Service	Management: Planning	Contract	
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	3271	Develop a plan to reduce impacts of other upland management practices such as forestry, grazing, and farming	Ongoing Current	FY 2006		County governments, U.S. Bureau of Land Management, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, U.S. Forest Service, Natural Resources Conservation Service	Management: Planning	Contract	In 2002, DEQ developed a TMDL for the Upper Klamath Lake sub-basin. As part of that effort, designated management agencies were to develop water quality management plans to improve water quality. Those plans are included in the 2002 TMDL. A similar effort is underway in the Lost River and Klamath River sub-basins should be completed in 2010.

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Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	3272	Implement the plan to reduce impacts of other upland management practices such as forestry, grazing, and farming in the basin	Ongoing Current	FY 2006		County governments, Klamath Basin irrigation districts, Klamath Tribe, PacifiCorp, Pacific Power & Light Company, U.S. Bureau of Land Management, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, U.S. Forest Service, Natural Resources Conservation Service	Management: Land Use	Contract	Efforts are ongoing to improve land management in the upper basin.
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	32811	Develop a plan to help prevent and deal with contaminant spills	Not Started			Oregon Department of Environmental Quality, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency	Management: Planning	Internal Administrative	In 2003, the Service met with DEQ and the Northern Pacific Railway to discuss spill containment planning. It was determined that the planning would be dependent on funding from EPA.
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	32812	Implement the plan to deal with contaminant spills	Not Started			Oregon Department of Environmental Quality, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency	Research: Environmental Contaminants	Internal Technical Assistance	

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Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	32821	Assess the impacts of chemicals applied in the basin to aquatic organisms	Partially Complete	FY 2000 - FY 2004		North Coast Regional Water Quality Control Board, Oregon Department of Environmental Quality, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, U.S. Geological Survey	Research: Environmental Contaminants	Contract	The USGS completed a study in 1992 to assess ecological contaminants associated with irrigation in the upper basin. A report (Dileanis et al. 1996. Water-Resources Investigations Report 95-4232) was published in 1996. Because that work was done over a decade ago, it would be advisable to repeat it. In 2007, the Refuge consulted on the effects of pesticide use on the Federal lease lands. It was determined that the program would not jeopardize the continued existence of the suckers.
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	32822	Develop a plan to reduce potential effects of chemicals applied in the basin	Ongoing Current	FY 2000 - FY 2004		North Coast Regional Water Quality Control Board, Oregon Department of Environmental Quality, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, U.S. Forest Service, Natural Resources Conservation Service	Management: Planning	Internal Administrative	The Klamath Basin Refuges has developed a pest management plan to reduce chemical use on the lease lands in the refuge.

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Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	32823	Implement the plan to reduce potential effects of chemicals applied in the basin	Ongoing Current	FY 2000 - FY 2004		North Coast Regional Water Quality Control Board, Oregon Department of Environmental Quality, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, U.S. Forest Service, Natural Resources Conservation Service	Management: Land Use	Internal Administrative	Klamath Basin Refuges is implementing their plan to reduce pesticides on Refuge lands.
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	331	Investigate additional water storage in the Upper Klamath Basin	Ongoing Current	FY 2000 - FY 2004		U.S. Bureau of Reclamation	Management: Land Use	Internal Administrative	Beginning in 1998 Reclamation started using Agency Lake Ranch for additional storage. Additional storage will be created as other former wetlands are reopened to the lake. The Williamson River Delta was connected in 2007 and 2008 adding about 20,000 af of storage. Other sites are being planned. Long Lake is the most promising site and Reclamation is assessing its feasibility as a water storage reservoir. Reclamation is also doing a feasibility study of additional storage in Long Lake.

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Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	332	Assess the potential for water exchange from the Four-Mile Transbasin Diversion	Complete	FY 2000 - FY 2004	FY 2000 - FY 2004	U.S. Bureau of Reclamation	Management: Planning	Internal Administrative	Historically water from Fourmile Lake used to flow into Upper Klamath Lake near Rocky Point. About 75 years ago flow was diverted from Fourmile Lake to the Rogue River basin. The Forest Service, Reclamation, and the Service have all looked into the feasibility of restoring flows back to the Klamath but no action has been taken on it because of water rights and minimal amount of water it would provide.
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	333	Determine minimum pool and instream flow requirements for stable sucker populations in the upper Klamath Basin	Ongoing Current	Prior to FY 1995		U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, U.S. Geological Survey	Research: Habitat Requirements	Contract	Considerable research has gone into determining the water needs for suckers, especially in Upper Klamath Lake and that work is continuing. The available information was reviewed in a recent biological opinion 2008, and in other reports including NRC (2004) and ISRP (2005).

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Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	3341	Determine the relationship between lake volume and water quality in Upper Klamath Lake basin	Partially Complete	FY 1995 - FY 1999		U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service	Research: Habitat Requirements	Contract	The relationship between lake elevation and water quality has gotten some attention. In 1996 USGS published a paper on the topic (Wood et al. 1996. Water-Resources Investigation Report 96-4079. The 2001 and 2002 biological opinions and NRC (2004) and ISRP also reviewed available information on the topic. The most recent report, Morace 2007; USGS scientific Investigations Report 2007-5117) found that no single variable has a dominate effect on water quality and it appears that conditions are determined by a combination of factors, of which lake levels are one.
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	3342	Develop plan to secure adequate water levels and flows for suckers in the Upper Klamath Lake basin	Not Started			Oregon Department of Fish and Wildlife, Oregon Department of Water Resources, Klamath Basin irrigation districts, Klamath Tribe, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, U.S. Forest Service	Management: Planning	Internal Administrative	A new BO in 2008 addressed Upper Klamath Lake levels and found that Reclamations proposed action would not jeopardize the suckers.

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Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	3343	Implement the plan to secure adequate water levels and flows for Upper Klamath Lake	Not Started			Oregon Department of Fish and Wildlife, Oregon Department of Water Resources, Klamath Basin irrigation districts, Klamath Tribe, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, U.S. Forest Service	Management: Planning	Contract	
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	3351	Investigate alternative ways to balance water demands for Clear Lake	Not Started			California Department of Water Resources, Oregon Department of Fish and Wildlife, Oregon Department of Water Resources, U.S. Bureau of Land Management, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game, U.S. Forest Service	Management: Planning	Contract	
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	3352	Develop a plan to secure adequate water levels and flows for stable sucker populations in Clear Lake	Not Started			California Department of Water Resources, Oregon Department of Fish and Wildlife, Oregon Department of Water Resources, Klamath Basin irrigation districts, U.S. Bureau of Land Management, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game, U.S. Forest Service	Management: Planning	Internal Administrative	

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Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	3353	Implement plan to secure adequate water levels and flows for stable sucker populations in Clear Lake	Not Started			California Department of Water Resources, Oregon Department of Fish and Wildlife, Oregon Department of Water Resources, Klamath Basin irrigation districts, U.S. Bureau of Land Management, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game, U.S. Forest Service	Management: Other	Internal Technical Assistance	
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	3361	Develop a plan to secure adequate water levels and flows for stable sucker populations in Tule Lake	Not Started			California Department of Water Resources, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game	Management: Planning	Internal Administrative	
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	1	3362	Implement the plan to secure adequate water levels and flows for stable sucker populations in Tule Lake	Not Started			California Department of Water Resources, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game	Management: Planning	Internal Administrative	
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	2	3411	Examine effectiveness and feasibility of alternate strategies to provide fish passage around Sprague River Dam	Complete	FY 2000 - FY 2004	FY 2005	Oregon Department of Fish and Wildlife, Klamath Basin irrigation districts, Klamath Tribe, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service	Research: Management Techniques	Contract	Reclamation and BIA developed a proposal in 2005 to remove Chilquinn Dam in order to improve fish passage. Work would have started in 2006, but several issues prevented it from starting. Work began in 2007 with the construction of a new fish screen, and the dam was removed in August 2008.

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Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	2	3412	Implement the most effective strategy to provide fish passage upstream of Sprague River Dam	Complete	FY 2008	FY 2008	Oregon Department of Fish and Wildlife, Klamath Basin irrigation districts, Klamath Tribe, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service	Other	Contract	In July 2008, the Chiloquin dam was removed by BIA and Reclamation. The spring of 2009 was the first season that suckers were able to migrate upstream of the dam unimpeded since 1914.
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	2	3421	Identify existing and potential spring spawning sites in Upper Klamath and Agency Lakes	Complete	FY 1995 - FY 1999	FY 2000 - FY 2004	Oregon Department of Fish and Wildlife, Klamath Tribe, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service	Research: Habitat Status	Internal Field Assistance	Sucker spawning sites in Upper Klamath Lake are now known.
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	2	3422	Secure spawning sites at springs in Upper Klamath and Agency Lakes	Discontinued	FY 1995 - FY 1999		U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service	Management: Planning	Internal Administrative	The Service is working with stakeholders to develop a plan to enhance Upper Klamath Lake sucker spawning sites. Implementation of the plan is expected within a year. There are no known spawning sites in Agency Lake.
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	2	3423	Determine preferred physical, hydrological, and water quality parameters for spawning at springs	Partially Complete	FY 2000 - FY 2004		Oregon Department of Fish and Wildlife, Klamath Tribe, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service	Research: Habitat Requirements	Contract	The Klamath Tribes has done some research on habitat conditions at UKL springs. USGS has done monitoring of these sites for about 10 years.
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	2	3424	Develop a plan to improve springs for spawning	Ongoing Current	FY 2006		Oregon Department of Fish and Wildlife, Klamath Tribe, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service	Management: Planning	Internal Administrative	The Service is working with stakeholders on a plan to enhance springs. Funding was secured in 2008 for restoration at Barkley Springs and work will begin in 2009 or 2010.

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Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	2	3425	Implement the plan to enhance the spring spawning habitat	Not Started			U.S. Bureau of Reclamation	Management: Planning	Internal Administrative	See comment on 3424.
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	2	3431	Develop a spawning habitat improvement plan for the lower Lost River	Ongoing Current	FY 2005		U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, California Department of Fish and Game	Management: Planning	Internal Administrative	In 2008 the Service and Reclamation enhanced spawning habitat at Anderson Rose Dam in the lower Lost River.
Lost River sucker (Deltistes luxatus), Shortnose Sucker (Chasmistes brevirostris)	2	3432	Implement the plan for spawning habitat improvements in the lower Lost River	Ongoing Current	FY 2006		U.S. Bureau of Reclamation	Management: Planning	Internal Administrative	See comment above at 3431.